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ABSTRACT

In an effort to reach widely dispersed Indian children and provide them with an early education that will encourage them to enroll in conventional schools after the fourth grade, Jesuit missionaries in a mountainous rural area of Mexico have provided a radio school since 1955. The evaluation reported here reveals that the radio schools have been most useful to those who are not disadvantaged, making integration of the rural Indians into the national culture and economy even more difficult. After an analysis of the problems of the radio schools, a drastic reform plan is presented. (RH)

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THE RADIO SCHOOLS OF THE TARAHUMARA, MEXICO: AN EVALUATION

BY

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Institute for Communication Research
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March, 1973

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THE RADIO SCHOOLS OF THE TARAHUMARA, MEXICO: AN EVALUATION

I. Introduction

A. The Socio-Cultural Context

The Sierra Tarahumara is part of the state of Chihuahua in Northwest Mexico. Constituting an area of 40,000 square kilometers, it is characterized by its broken mountain ranges and severe cold in winter. Besides being one of the most remote areas in Mexico, it suffers from conditions that make agriculture difficult. Nevertheless, it is precisely agriculture that is the principal activity of the inhabitants of the area, who mainly grow corn for their own consumption. They also raise sheep which are not consumed for food but provide an important fertilizer for the land.

The broken mountain ranges and the lack of ways to communicate heighten the considerable dispersion of the population. The few centers of population are the results of the introduction of some basic infrastructure and service activities. The indian population of the Sierra Tarahumara is even more dispersed than that of other ethnic groups.

The total population of the Sierra Tarahumara was 125,000 in 1960, of which 50,000 were Tarahumara indians. The difference from other parts of Mexico is that there has been practically no mixing of races here. There are commercial dealings between the Tarahumara and whites*, but the Tarahumara are noted for their isolation, provoked by the immigration of white inhabitants who set themselves up on the best lands that had been occupied by the Tarahumara.

The Tarahumara area, though poor in agriculture, is rich in forests, minerals and grazing lands. The forests, and until recently the mines, were worked by outside companies that hired local labor. This arrangement lent itself not only to the exploitation of the ejidatario** but a careless destruction of the trees.

The family is the basic unit of the Tarahumara society. The concept of "the people" is another important and meaningful unit of society which reflects the Tarahumara method of governing through councils. The Tarahumara are accustomed to communal work and they offer the Tesguino (a fermented corn drink) in exchange for their collaboration in

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*The word Tarahumara will refer to the principal indian group in the Sierra Tarahumara. Whites would be any one else who is not culturally indian. Racially, most others would be mestizos--that is, the result of intermarriage of indians and non-indians.

** An ejidatario is a Mexican peasant who works on common land, called an ejido.

the planting and harvesting of the corn. Drinking Tesguino is one of the main motives for the meetings of the Tarahumara in addition to being the most important occasion for social interaction, relaxation and entertainment.*

B. The Jesuit Mission to the Tarahumara

The Jesuit missionaries have been in the Sierra Tarahumara since 1900, after more than a century of exile. The objective of the mission at its inception was defined as "evangelizing and civilizing the indians." During the first years of missionary effort, the main work was that of spreading the gospel. In 1905, with the hope of combating more effectively "the barbarism, the pagan atmosphere and the ignorance", the Jesuits set up their first boarding school for children.

> "The idea at that time was to give them the best kind of education that their idiosyncrasy, savageness and the actual circumstances would allow for boarding students. Then, after two

*For more information on the Tarahumara: Bennet and Zingg, The Tarahumara. Chicago, 1935; Champion, Acculturation among the Tarahumara of Northwest Mexico since 1850; D.C. Gabjbusek, "The Sierra Tarahumara." Geographical Review, XLIII, no. 1, 1953; J.G. Kennedy, A Tarahumara Gentile Community: Social Organization and Extracultural Influences. Los Angeles: Univ. Southern California Press, 1961; C. Lumboltz, Unknown Mexico. New York, 1902; C. Pennington, The Tarahumara of Mexico: Environment and Material Culture, Salt Lake City: Univ. Utah Press, 1963; F. Plancarte, El Problema Indigena Tarahumara, Mexico: Instituto Nacional Indigenista, 1945.

> or three years, we were to cast them out into the vagaries of life with the belief that the the lessons learned in our classes and the good habits that we had inculcated would suffice them, as it did our students in the cities, to live as honorable and civilized citizens, but most of all as good and fervent Christians."*

Although there remain the traces of this "salvation" mentality, the effects of the Second Vatican Council, the meeting of the Latin American Bishops at Medellin and the current social doctrine of the Catholic Church are all obvious among missionaries and are redirecting the Jesuit mission to the Tarahumara, although the exact direction has yet to be determined.

C. History of the Radio Schools

There was a deeply rooted idea among the missionaries that education was one of the most effective solutions for the backwardness of the Tarahumara people. However, even though the missionaries were able to bring the native population together into concentrations, the educational effort failed. The boarding schools could not hope to cover the educational demand of a population as dispersed as that of the Sierra Tarahumara. It was for this reason that the Radio Schools (referred to as RSs subsequently) were begun in 1955. These were founded on the principle that education would be extended beyond the boarding schools to reach the larger proportion of the native population. More than that,

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* N. Ocampo, Historia de la Mission Tarahumara. Mexico, S.E., 1950. p. 207.

they would be able to complement the educational effort of the state and federal government and RSs could be created precisely in those areas where there was little possibility of setting up an official school. For this reason, although the RSs had their inspiration from the educational philosophy of Sutatenza Radio in Colombia, unlike their Colombian model, they were directed from the beginning to a young formal school population.

Since the RSs began as an extension of the Jesuit boarding schools, it may be assumed that from the beginning they shared their objective of evangelizing and civilizing the Tarahumara of the Sierra. But more than this, given that they were also founded partly to complement the official educational effort, they would have to offer primary education. In 1957, the Tarahumara RSs gained legal status as a cultural extension of the Iberoamericana University in Mexico City and the permission of the Secretariat of Public Education to teach the first two grades of primary. A short time later they received an informal permission to teach two more grades (to the fourth grade) as an experiment. From the previous point it followed that another objective was to offer the first grades and have them be of such quality that graduates of the RSs who wanted to might continue their studies in regular schools. It was because of this that the educational

content was based almost exclusively on the official curriculum, and the free textbooks* were used as the basis for radio programming.

The RSs work as follows: the studio and central transmitter are located in the mission headquarters of Sisoguichi. The classroom radios are tuned solely to the frequency of the Sisoguichi transmitter. Two teachers from a primary normal school teach all of the radio classes. At the time of this study (1971), there were 46 schools with 1,081 students spread out over 10 municipalities in the Sierra. (See Table One.) Each school has one or two "auxiliary teachers"--persons who have had no more than primary education themselves. The auxiliary's job is to organize the classes, transmit the information received by radio, supervise, guide, and correct the work of the students. These teachers have received training courses during the summer in Sisoguichi where they learned and practiced teaching methods, and revieved and deepened their grasp of the subject matter they teach.

In the majority of cases, students from all the grades are in a single classroom. Each subject matter is

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* Mexico has long had a uniform, offical set of free textbooks for primary schools. They are printed and distributed in millions of copies each year. 1972-73 saw the introduction of a revised first and second grade texts.

Table 1

SUMMARY OF THE BASIC DATA OF THE STUDY

	Town	Sample
Number of schools	46	24
Number of students	1081	161
First grade		95
Second grade		35
Third grade		18
Fourth grade		13
White students		81
Tarahumara students		53
No information		27
Number of former students who continued studying		31*
Number of former students who did not continue studying		29*
Number of teachers	53	31
Number of fathers		185

*Non-representative sample

broadcast during one hour, 15 minutes devoted to each school grade. During the 15 minutes for a particular grade, the pupils of that grade work directly with the radio; in the remaining 45 minutes, they do their individual exercises. In short, while the broadcasts are intended for specific grade levels, the school takes on the characteristics of a non-graded school. (See Table Two.)

Five of the RSs presently in operation are semi-boarding schools, all located in the Tarahumara areas of the Sierra. These schools were begun in the 1969-70 school year to solve the absentee problem in these areas. Since the population in these areas is quite dispersed, children have great difficulty in getting to classes regularly. These schools act as boarding schools from Monday through Friday. Students are given meals and a place to sleep. This measure tries to make certain that students attend school every day of the week.

With all this, the objectives, goals, and policies of the RSs have never been made clear. From a beginning that tried to provide an education that was basically directed to the Tarahumara population, the effort has changed, as will be shown, to an education that serves the white population of the Sierra and keeps the Tarahumara in a marginal position.

TABLE 2

Class Schedule of the Tarahumara Radio Schools
(September to January, 1970-71)

Morning:	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	GRADE
10:00-10:30	Reading	Reading	Reading	Reading	Reading	First
10:30-10:45	Reading	Language	Reading	Language	Reading	Second
10:45-11:00	Reading	Language	Reading	Language	Reading	Third
11:00-11:15	Reading	Language	Reading	Language	Reading	Fourth
11:15-11:30	R	E	C	E	S	S
11:30-11:45	Arith and Geometry	Arith and Geometry	Arith and Geometry	Arith and Geometry	Arith and Geometry	First
11:45-12:00	Arith and Geometry	Arith and Geometry	Arith and Geometry	Arith and Geometry	Arith and Geometry	Second
12:00-12:15	Arith and Geometry	Arith and Geometry	Arith and Geometry	Arith and Geometry	Arith and Geometry	Third
12:15-12:30	Arith and Geometry	Arith and Geometry	Arith and Geometry	Arith and Geometry	Arith and Geometry	Fourth
12:30-12:45	News, greetings, or songs				Stories	
Afternoon:						
4:00-4:15	Art	Practice in Language and Arithmetic				First
4:15-4:30	Hygiene	History	Geography	Art	Penmanship	Second
4:30-4:45	Science	Geography	Science	Geography	Science	Third
4:45-5:00	Science	Geography	Science	Geography	Science	Fourth
5:00-5:15	History	Civics	History	Penmanship	History	Third
5:15-5:30	History	Civics	History	Penmanship	History	Fourth

D. The Coming of Change in the Sierra

At present, the Sierra population is experiencing rapid changes. The rugged terrain of the Sierra and the lack of communications have until now held back the increase of government programs. Nevertheless, in mid-1971 the Sierra became the focus of government interest. There is hardly a week that goes by now that news about the Sierra does not appear in the national newspapers. In less than a year, members of the Supreme Council of the Tarahumara have had two visits with President Echeverria of Mexico.* Every day, the number of government projects concerned with the development of the Sierra grows. The National Indian Institute (Instituto Nacional Indigenista) is enlarging its radius of activity. The Administrative Committee for the Federal Program of School Construction (CAPFCE) is building seventeen semi-boarding schools to prepare Tarahumara community development workers. The Secretariat of Works has started the construction of a large network of highways that will cross the Sierra. The National Institute of Rural Community Development (INDECO) is already working on the promotion of tourist ejidos. There is also thought about forest exploitation with large investments of capital. And

* The Supreme Council of the Tarahumara was promoted by the National Indian Institute to achieve a representative organization of the Tarahumara so that they would have a voice in matters of local and national importance.

with all this, extensive programs of hygiene and health are planned. Undoubtedly the effect of such a program would be to lower infant mortality and increase in a significant way the younger population.

All of the government projects are focused on the "integration of the Tarahumara into national life." As the Center for Research and Social Action (CIAS) clearly pointed out in the conclusions of a socio-economic study on the Sierra Tarahumara: ". . . this integration means taking part in the consumer economy, in the system of market economy." This presents serious questions: to enter the market in the Sierra means to enter into it in a minority position that creates relationships of even greater dependency on whites. " . . . this will mean a break with the traditional social system. Cooperation will have to become absorbed in salaried manual labor and consequently social interaction will be different. There will be more conflict in relationships outside than within the community and this will create a new type of authority structure."*

From the above, it is clear that an intensive educational effort is needed to prepare the Tarahumara population to really benefit from these changes. Such an education would focus on adults and young adults since these

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*Cf. CIAS, "Estudio Tarahumara," Mexico: Centro de Investigacion y Accion Social, A.C., 1971 (mimeo).

are most in need of immediate preparation to defend the rights of their people so that they can participate on an equal footing in the development of their area and not at the same time lose their cultural identity and values. As the study shows below, however, the RSs as they now operate focus on Tarahumara children in the first few grades and, even with them, results of the schools favor the educational development of their white school mates. Even when some Tarahumara children finish the four grades, the result is that either the graduate does not use his education for different kinds of work in his community or he leaves that community, never to return. In short, if the efforts of the RSs are to benefit the intended Tarahumara population in a way that helps genuine integration into national life, then basic changes are called for. It is this important consideration that has inspired the suggested reforms of the RSs outlined below.

II. The Evaluation of the Tarahumara Radio Schools

A. Introduction

The lack of clear objectives and of short, middle and long range goals caused the RS authorities to begin to question the apparent progress of this project and to outline the true purpose of the schools. They did not have sufficient information on what had been achieved by the RSs up to the time of the study.

The idea of redefining the goals and objectives of the project had to be based on a better knowledge of the population involved, their aspirations and possibilities, and the effects that the RSs were producing. For these reasons, the authorities of the project asked the Center for Educational Studies (CEE as it will be referred to henceforth) in Mexico City to undertake a thorough study of the problem. The first step was a preliminary visit to the Sierra Tarahumara. The visit resulted in a decision that a first step toward redefining objectives and functions of the RSs would demand more complete information on the people involved in the schools: teachers, students, graduates and families of students.

B. Research Design and Methodology

The development of the general and specific objectives that the CEE carried out were based on the particular interests of the director of the RSs. They were as follows:

1. General Objectives:

a. To undertake a preliminary evaluation of the current efficiency of the RSs;

b. To achieve greater understanding of the current system of RSs and to better define the basic problems that affect their operation;

2. Specific objectives: there were specific questions that were posed with each general objective. These questions reflected the points of greatest interest to the administration of the RSs.

3. Instruments: Instruments appropriate to answer the questions were designed by the CEE staff in Mexico City. They were developed with the goal of getting as much information as possible on each specific question for all of the sectors of the population that is related to or affected by the RSs. Achievement tests in Spanish and Arithmetic were developed for application to students, teachers, and graduates of the schools.*

Since the study was exploratory, it seemed preferable to work with less structured survey instruments than with rigidly precoded questionnaires. On the other hand, the instruments were designed before the study director got to know the area and the population. For the same reason, it was necessary to submit some instruments to a validity check. They were first examined by the director of the RSs and his staff, who know the area and population well. Afterwards, they were pretested in three schools that the director considered "typical" but were not too far from the

* The achievement tests that were used were adapted from tests developed at the National Pedagogical Institute (Instituto Nacional de Pedagogia).

mission headquarters in Sisoguichi: a school for white students, a school for Tarahumara students, and a mixed school. Subsequent modifications in the instruments gave their regular administration a firmer basis for success.

4. The sample: The sample of informants was as follows: 24 schools were chosen--more than half the total number. The selection of the schools was made by the director who took into account criteria of both representativeness and accessibility.

A random sample, stratified by grades, of 30 percent of all enrolled students in each school was taken. A 50 percent sample of this student group was subsampled for interviews with parents. Moreover, within the proximity of the school's influence, researchers tried to interview all parents who did not send their children to school or whose children had left school or were thought by teachers to have an unusually high absentee rate.

All teachers and directors of the sample schools were interviewed. Also interviewed were the dropouts that could be found in each community. In addition, interviewers visited 3 government primary schools (complete six grades) where they interviewed graduates of the RSs who were continuing their studies. Unfortunately, the sample of former students could not be representative.

From the experience of pretesting the instruments and from talks with people knowledgeable about the region, the researchers considered it relevant to make a direct observation of the community life of the regions they visited. For this reason, they observed three hours of class in each school and carried a diary where they noted all of the observations made in the community and the interviews with people not included in the sample.

5. Analysis and interpretation of the data: The first stage of data analysis and interpretation consisted in a hand-calculated set of basic percentages. These provided a basis for the formulation of certain hypotheses that were later tested statistically. Cross tabulations as well as Pearson correlations on teacher, student, family, and former student data were done and tested for degree of association.

C. Results of the Study

1. First General Objective: Efficiency of RSs. We will first look briefly at the most significant data on the efficiency of the RSs. Without pretending to do an exhaustive analysis of the results, we think that the data provide a sufficient basis for corroborating the conclusions of the study.

a. Student achievement: Although schools were in the eighth month of their school year, students were examined on the previous year's subject matter. For first

graders, tests had to be developed based on the matter covered up to the time of the testing. Test results are presented in Table Three.

On the assumption that the tests were valid, it is interesting to compare the results of Tarahumara RSs with those of a sample made of Class C private schools in Mexico City.*

Fourth grade students of the RSs obtained a mean of 60.1 percent in their final examinations in arithmetic, geometry and Spanish of the third year material; their counterparts in the Class C schools in Mexico City achieved a mean of 55.1 percent on the same tests. With these comparative data and with the additional information that results were not significantly different in a sample made in the public schools of Mexico City by the National Educational Institute, it is possible to conclude that the Tarahumara RSs are preparing fourth grade students at approximately the same level as schools in the capital. This indicates that the small proportion of students in the RSs who finish fourth grade are prepared to continue their studies in regular schools.

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*Cf. C. Munoz I. and J.T. Guzman, "Una Exploracion de los Factores Determinantes del Rendimiento Escolar en la Educacion Primaria," Revista del Centro de Estudios Educativos, I, no.2 (April-June, 1971), pp.7-28.

Table 3

Student Achievement

Test	GRADE								ALL GRADES	
	First		Second		Third		Fourth		Total	
	Score	N	Score	N	Score	N	Score	N	Score	N
Arithmetic and Geometry	48.18	95	67.94	35	57.67	18	53.77	13	58.99	161
Language	48.80	95	70.23	35	67.44	18	66.38	13	56.96	161
TOTAL	48.49	95	69.09	35	62.56	18	60.08	13	55.48	161

No multiple correlation or regression analysis was done using achievement scores as the dependent variable. Nevertheless, it is possible to identify the variables that relate to achievement as a result of the cross tabulations and correlations that were done.

Ethnic group: The make-up of the present ethnic profile of the RSs makes it clear that they serve a racially mixed school population. Similarly with regard to curriculum, one must keep in mind that teaching is based on the official curriculum, the same as that closely followed by the radio broadcasts. The broadcasts are in Spanish, despite the fact that the majority of the Tarahumara population speak only their own language. One should recall, too, that the Tarahumara have remained isolated from the whites and so racial division between the two ppopulations is not only a clear social fact but is likely to influence schooling as well.

Taking the student's ethnic group as an independent variable, one finds a significant difference ($p<.01$) in the overall mean achievement (i.e., all tests combined) in favor of white students. The fact that this significant difference appears in the results of the Spanish tests and overall mean achievement but not in the separate artihmetic test suggests that this is due not to a lesser intellectual capacity of the Tarahumara students but rather to linguistic and cultural factors.

Another datum in support of this hypothesis is that the level of significance in achievement differences between the two groups increases from first to second grade. In contrast to what the data showed, it was expected that this difference would be reduced. The above data suggest that the low achievement of the Tarahumara may be explained more by cultural factors (content that is foreign to both the situation and the people) rather than by factors of ability or intelligence.

A student's ethnic background is clearly a determining factor in his achievement. One may conclude this section by saying that the RSs are largely benefiting the white population, perhaps because of the content and method of education they use.

Although age was tested as a predictor of achievement, no findings of great importance emerged.

Grade: The grade level turned out to be one of the factors that most influenced achievement (See Table Four). If one takes all grades separately, there is a significant correlation ($p<.05$) for achievement in favor of the higher grades. If one dichotomizes the group into first grade and all of the others (second, third and fourth), one finds a greater significance ($p<.01$), again in favor of the higher grades in the RSs. These data suggest that the first grade is an important initial barrier of selection, basically favoring white students.

Table 4

Mean Achievement, by Ethnic Group and by Age

	1st			2nd			3rd			4th			Total		
	Arith. and Geom.	Span.	Mean	Arith. and Geom.	Span.	Mean	Arith. and Geom.	Span.	Mean	Arith. and Geom.	Span.	Mean	Arith. and Geom.	Span.	Mean
Tarahumaras	52.2	35.4	43.9	53.0	64.5	59.0	23.0	63.0	43.0	--	--	--	49.9	42.0	46.3
Mestizos	43.5	54.9	47.8	63.1	80.0	75.0	53.8	72.8	63.7	52.6	71.8	62.4	49.9	42.0	46.3
Older Tarahumaras	50.0	45.0	44.8	65.1	55.5	60.5	43.0	53.5	48.5	--	--	--	53.4	47.8	48.6
Older Mestizos	58.9	63.6	55.2	72.5	78.2	75.6	70.2	69.8	70.2	56.3	56.3	56.3	64.6	68.5	64.1
Tarahumaras and Older Tarahumaras	50.5	43.6	47.2	63.8	59.6	61.9	36.3	56.7	46.7	--	--	--	52.5	46.8	50.2
Mestizos and Older Mestizos	49.8	55.0	52.5	70.4	78.8	75.9	61.9	69.6	65.9	53.8	66.6	60.3	56.7	64.2	61.0

Family and background variables: Of a series of family and background variables, only one, mother's education, was found to be significantly related ($p<.05$) to student achievement.*

It is surprising that none of the other variables that were considered seemed to have an influence on student learning.

Teacher variables. Three teacher factors were taken as independent variables in the analysis: knowledge of content (based on their performance on sixth grade tests); teaching experience, and number of summer teacher training courses they had attended.**

Concerning knowledge of content, teachers had a mean in arithmetic and geometry of 47.9 percent and in Spanish of 75.5 percent on the tests. Since no significant correlation was discovered between teachers' knowledge and student achievement, one may suggest either that the teachers are very homogeneous in the knowledge level (but in fact the distribution of scores followed almost a normal curve) or that the radio, the official curriculum or the

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* For family and background variables, the analysis was only made with the overall mean of all the tests and not for each test separately.

** The central headquarters of the RSs offers teacher training courses each summer. Although one would expect that the teachers with more teaching experience would be those with more such courses, it did not turn out this way.

official textbooks, or perhaps a combination of these three factors, intervenes to level existing differences among them.

A significant relationship ($p<.05$) was found between teaching experience in the RSs and student achievement. Nevertheless, there was no relationship between the number of summer courses teachers had attended and student learning. This last finding may call for an examination of the efficacy of the teacher training summer courses sponsored by the RS leaders.

In summary, an examination of student achievement shows that the ethnic factor was the predominate one in predicting levels of learning for students in the RSs.

b. Student Dropouts:

Interyear dropout: Unfortunately it was not possible to collect differential data on failure and dropout rates because information of this kind did not exist at RS headquarters. However, the dropout rates between years for eleven cohorts during the period 1957-1971 demonstrated that interyear dropouts were large, nearly 85 percent (See Table Five).

As a point of comparison it may be worth mentioning that in the cohorts for 1967-1970 from first to fourth grade the national mean for such dropouts for public schools was 50.2 percent and 72.3 percent for rural schools only.*

* Cf. Boletin CEE, V, no. 3 and the Revista del Centro de Estudios Educativos, I, no. 2 (April-June, 1971).

Table 5

Student Dropouts

Cohorts	Enrolled in First	Finish 4th	Graduation rate	Dropout rate
1957-58 to 1960-61	31	0	0%	100.0%
1958-59 to 1961-62	33	3	9.1%	90.9%
1959-60 to 1962-63	69	20	29.0%	71.0%
1960-61 to 1963-64	142	18	12.7%	87.3%
1961-62 to 1964-65	211	37	17.5%	82.5%
1962-63 to 1965-66	238	57	24.0%	76.0%
1963-64 to 1966-67	284	65	22.9%	77.1%
1964-65 to 1967-68	366	13	3.6%	96.4%
1965-66 to 1968-69	317	50	15.8%	84.2%
1967-68 to 1970-71	263	43	16.4%	83.6%

Considering these data, the dropout rate for the RSs seems excessive.

On the other hand, the RSs have no set criteria for opening or locating new schools. Consequently, there are a large number of schools that close. In the previous dropout analysis, the number of dropouts due to school closings was examined, but for an overall view of cost implications in such closings, it would be necessary to take into account the figures contained in Table Six.

Intrayear Dropout: Lacking data on failure rates, one can only analyze the data on dropouts (as seen in Table Seven).

The consistent yearly increase in dropouts perhaps is due to rapid expansion of RSs, beyond the operational and administrative capacity of the system. Project leaders have only a precarious control over the schools and there is a manifest lack of planning. School supplies run out and are not replaced promptly. Problems that may arise between the teacher and the community can be aggravated without proper intervention.

On the other hand, the fact that dropouts increase steadily in higher grades might be due to the mounting opportunity costs of sending older children to school since they can contribute more to family income. Also one may

Table 6

Student Loss Rate by Grade due to School Closings

Year	Dropouts due to School Closings the Previous Year	Enrollment in Current Year	Percentage Lost
1965-66	234	481	33%
1966-67	34	623	5
1967-68	238	763	24
1968-69	181	810	18
1969-70	243	756	24
1970	320	631	34
Mean			23

Table 7

Interyear Dropouts

Year	1st			2nd			3rd			4th			Total		
	Enrolled	Finished	%	Enrolled	Finished	%	Enrolled	Finished	%	Enrolled	Finished	%	Enrolled	Finished	%
957-1958	32	31	3.1	4	4	0.0	--	--	--	--	--	--	36	35	2.8
.958-1959	33	33	0.0	8	8	0.0	--	--	--	--	--	--	41	41	0.0
959-1960	69	69	0.0	31	27	12.9	5	5	0.0	--	--	--	105	101	3.8
.960-1961	149	142	4.7	55	52	5.5	3	3	0.0	--	--	--	207	197	4.8
961-1962	243	211	13.2	111	80	27.9	24	17	29.2	5	3	40.0	383	311	18.8
962-1963	244	238	2.5	88	82	6.8	40	35	12.5	22	20	9.1	394	375	3.3
.963-1964	312	284	9.0	120	110	8.3	51	46	9.8	24	18	25.0	507	458	9.7
964-1965	396	366	7.6	195	165	15.4	103	96	6.8	44	37	15.9	738	664	10.0
965-1966	351	317	9.7	187	167	10.7	117	95	18.8	70	57	18.6	725	636	12.3
966-1967	501	410	18.2	187	145	22.5	129	99	23.3	86	66	23.3	903	720	20.3
967-1968	350	263	24.9	120	82	31.7	131	99	24.4	34	13	61.8	635	457	28.0
968-1969	441	353	20.0	178	140	21.4	119	82	31.1	76	50	34.2	814	625	23.2
969-1970	383	291	24.0	167	115	31.1	109	88	19.3	100	72	28.0	759	566	25.4
Mean			14.2			18.9			20.0			27.1			16.9

assume that dropouts are higher among Tarahumara students where the need for a child's help is greater. Some indication for this assumption may be seen in the schooling pyramid of both ethnic groups in Table Eight.

c. Satisfaction of Demand for Schooling: Given that the samples of parents who do not send their children to school was not random, it is impossible to infer what percentage of all Tarahumara children do not enroll in school. Still the data from interviews with these parents yield interesting indications of why they do not send their children to school. The proportion of children in school to the number of school-age children at home was analyzed. The analysis took this proportion as a dependent variable and found a series of factors that predicted why parents did not send their children to school.

One finds a significant relationship ($p<.01$) between father's education and the dependent variable. The more educated fathers are more likely to send their children to school. However, no such relationship was found for father's occupation or annual income.

Dividing the sample into literate and illiterate fathers, significance of the relationship disappears. One, then, may conclude that more than the fact of being literate or not, it is the number of years in school that is most influential in this case. Table Eight shows too that ethnic

Table 8

School Pyramid, by Ethnic Groups, of the Sample

Grade	1st		2nd		3rd		4th		Total	
Ethnic Group	Number	%	Number	%	Number	%	Number	%	Number	%
Tarahumaras	39	73.6	10	18.9	4	7.5	0	0.0	53	100.00
Mestizos	38	46.9	20	24.7	11	13.6	12	14.8	81	100.00
Total	77	57.4	30	22.4	15	11.2	12	9.0	134	100.00

group is an important predictor of whether a parent will send some or all of his children to school. One more variable that seems to influence whether children are sent to school or not is opportunity costs, that is, the help required of children in the mother's or father's work. The relationship of these variables is a significant one ($p<.01$). There were also a number of other variables that did not predict whether children would be sent to school or not.

In summary, the influential factors here are father's education, ethnic group, and opportunity costs. On the other hand, the fact that father's income and occupation are not predictors seems to mean that school is not perceived as a means of maintaining a certain occupational or economic status but rather a good in itself: it helps maintain the prestige of a family whose members have had a certain number of years of schooling.

d. <u>The Role of Formal Education in the Sierra</u>: Before analyzing more carefully the specific role of the RSs, it is worth considering some data on students' parents, both those who are illiterate and those who have part or all of primary education.

As one sees in Table Nine, the majority of occupations in the Sierra Tarahumara do not demand any use of school learning beyond the most basic elements of

Table 9

Parents' Occupations

Occupation	Number	Percentage
Just Farming	50	27.8
Farming and a Trade	12	6.7
Farming and Employee	5	2.8
Farming and Woodcutter	53	29.4
Farming and Roads	11	6.1
Farming and Business	3	1.7
Farming and Day-Laborer	9	5.0
Farming and Craftsman	4	2.2
Farming and Mining	2	1.1
Farming and Livestock	1	.6
Farming and Domestic Helper	2	1.1
Roads and a Trade	1	.6
Farming, Woodcutting, and Others	16	8.9
Other Work Exclusively	11	6.1
Total	180	100.00

literacy. For a majority of these occupations not even literacy is an absolute necessity. This may explain the lack of a significant relationship between father's education and occupation. Being literate or not does not seem to be associated with occupation. This seems to mean that things learned in school are not useful in order to change one's occupation or type of work.

Something else happens with annual family income. One finds a significant relationship between schooling and income ($p<.05$), and literacy and income ($p<.01$). If one takes into account that 22 percent of the literates are self-taught and that 46 percent of literates did not go beyond third grade, there are reasons for assuming that what is influencing income is not the number of years in school but literacy or illiteracy.

Schooling and literacy seem to influence income not so much by objective knowledge acquired in school as by a kind of "sixth sense" that must be acquired to keep oneself from being made a fool of in salary or business dealings.

e. <u>The Role of Formal Education in the Rss</u>: It is important to keep in mind that the RSs primarily give the first four grades of school, following very closely the official curriculum and without adding additional subjects. Based on the analysis of the types of work open to inhabitants of the communities where RSs are located, one

would expect that going to these schools would have one of two results: either the graduate leaves his community or he stays to go to work in the same kind of employment his father has where there is no vertical mobility. Tables Nine and Ten, taken together, show that with or without formal education, occupations in the Sierra Tarahumara do not change from one generation to another.

Clearly, there are other factors that influence the occupation of the graduate than the number of years in school. No one would deny that the RSs might be playing a role in helping individual mobility. What seems clear is that the individual cannot thus succeed within his home community; for him to have occupational mobility, he is forced to leave that community, and thus the community loses its better human resources. The RSs are contributing to this process.

Unfortunately, no data on how many graduates were continuing to study beyond fourth grade were available. Nevertheless, from observation and conversations with community people it is possible to assume that the proportion is very small. It is interesting to analyze the factors that influence whether graduates continue their studies or not.

In the first place, there was some relationship between father's education and whether the student dropped

Table 10

Occupations of Graduates from the Radio Schools

Occupation	Graduates Who Keep Studying		Graduates Who Don't Keep Studying		Total of Graduates Who Work	
	Number	%	Number	%	Number	%
Farming	4	26.7	8	27.9	12	27.3
Domestic	10	66.7	18	62.1	28	63.6
Teacher	1	6.7	--	--	1	2.3
Employee	--	--	1	3.5	1	2.3
Roads	--	--	1	3.5	1	2.3
Woodcutter	--	--	1	3.5	1	3.5
Total	15	100.00	29	100.00	44	100.00

Note: The percentages do not equal 100 due to rounding errors.

out before the end of fourth grade, finished fourth and stopped or continued into fifth. More educated fathers had sons more likely to continue. This suggests that schooling is a means of maintaining the prestige the father has for having gone to school.

Father's occupation is also somewhat related to continuing school. However, the factor most closely associated with continuance in school is father's annual income ($p<.01$ in favor of higher income). This suggests that if the RSs are providing individual upward mobility, they are providing it for those already more advantaged. This finding replicates a national phenomenon that suggests that education is a monopoly of the relatively better-off students. As a consequence, the RSs seem to be helping to reinforce existing inequalities. One finds additional evidence in the significant relationship ($p<.05$) between a student continuing his studies beyond fourth grade and whether his father is in cash cropping or subsistent agriculture.

One also finds a relationship between age and continuation in studies, in favor of younger students. This means that the opportunity cost of sending a child to school is greater as students grow older. The analysis also shows that the older schools are those that produce more students who continue to study.

In sum, those factors that most influence a student's continuing in school are (in order of importance) family income, cash cropping, father's occupation and education, and age of the student. On the other hand, it seems that the future work of the student, at least in his own community, is not determined by the number of years in school but rather by such family variables as education of father and mother and occupation of the father.

2. Second General Objective: Problems of the RSs

The basic problems affecting the operation of the RSs may be briefly summed up as follows:

a. Lack of objectives, goals, and well-defined policies: The proper operation of an institution requires a clear statement of general objectives and short and long range goals. A statement of this kind allows evaluation of the institutional activities in terms of fulfilling or not its stated goals and periodically correcting and modifying these activities. In the case of an educational institution, the statement of these objectives and goals should be based on the specification of the educational needs of the region or locality where it hopes to work.*

As was pointed out previously, the RSs have not had since their beginning a clear statement of objectives and

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* Cf. C.Munoz I. La Planificacion Educativa, Mexico: Centro de Estudios Educativos, 1968.

goals or a broad understanding of the educational needs of the region. This has provoked a series of problems that will be discussed below:

b. Lack of cultural homogeneity among students: Without specifying objectives and goals for the target audience and above all the changes they wished to bring about in it, the RSs currently find themselves at the service of a heterogeneous population in which the pressures of the dominant groups are obviously felt most keenly. Moreover, it is likely that their work in the area of changes in cultural relations would be very limited and, in fact, even counterproductive. All of this undoubtedly affects the proper functioning of the RSs because it means a low attendance rate at schools in the Tarahumara zones, or what is the same, a high level of unsatisfied educational demand; it also affects retention and achievement, both low for Tarahumara students.

c. Lack of a common motivation among auxiliary teachers: The individual motivations for being teachers (e.g., to make money, thank the missionaries for the education they have been given, work for a while before getting married, etc.) seem to have priority over the objectives of the institution which they work for. These institutional objectives are admittedly very vague and have not been concretized in such a way as to help define the

role of the auxiliary teacher himself. The expected behavior of the auxiliary teacher touches on such a wide range of activities that they cannot be evaluated and they vary from community to community.

d. Lack of a curriculum adapted to the local situation: One fundamental weakness of the RSs is that when they were first being organized, the socio-economic and job market structure was not taken into account. And thus there was a basic lack of correspondence between RSs' education and the needs of the area.

In the environment of the Sierra Tarahumara, the individual most needs basic knowledge of reading, writing, arithmetic, agrarian law, elements of social organization, and above all, an ability to understand his situation in order to be able to defend himself against exploitation from those with whom he has commercial dealings, be they of salaried work or of property. In the isolated situation in which the Tarahumara live, it is even more necessary to offer a training that will help them to a greater self-sufficiency--whether individual or community--in order to satisfy their basic needs of food, clothing, and shelter. Above all, they need an education that will train them to be able in the most favorable way possible to face technological, economic and, consequently, cultural and

social change that will come. It profits them very little to know history, geography, or standard grammar (things that take at least 30% of radio broadcast time, Cf. Table Two) if they can not understand themselves within their own context and become self-reliant in their organization and action. Since the RSs do not establish the necessary relationship between the school and the socio-economic structure of the community, they are unlikely to succeed in defining the change that they wish to bring about through radio instruction.

The only thing that apparently justified the effort that was put into the RSs was the contribution they made to overcoming the permanent backwardness of the inhabitant of the Sierra. The lack of other, more specific objectives, derived from the real socio-economic conditions of the Sierra inhabitants, has kept attention from more essential aspects and has hindered evaluation of the schools.

The teaching of fundamental knowledge in school takes too long because it is mixed with things that are of little importance to the satisfaction of the necessities spoken of above. Moreover the tool for literacy was the official textbook whose content seems to have been prepared with urban students in mind, to the neglect of the rural situation and the specific necessities of those who live

there.* The result is that the graduates of these schools either continue to live in their community and carry on the same work as their fathers, or else leave their community to secure work in larger cities where some of them continue to study. In this way, the school either contributes to the flight of some of the community's best human resources, or, at least, deprives parents of the help of their children for a minimum of four years. All this in order to make students literate and, in some cases, to teach them Spanish. In short, the formal school curriculum is only useful for those graduates who continue their studies.

This creates a serious problem concerning the function of RSs. Since the content taught in these schools is not adapted to the felt and real needs of the community, the consequence is that the community generally sees the school as having a vague utility, as useful in itself, but with few practical results other than learning to read, write, and figure. The result is that, with few parents willing to forego completely their child's labor, the child has a poor attendance record in school. Student attendance goes down most during the months of farm work. In sum, the index of potential demand satisfaction is low even for those areas where the schools operate.

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* Cf. C. N. Myers, Education and National Development In Mexico. Princeton: Princeton Univ. Press, 1965.

e. Lack of local participation in founding and operating the schools: The problem of irrelevant content of the RSs is both a cause and a consequence for the failure of local participation in building and operating the schools. This creates such problems as failure to see the usefulness of schooling.

The fact that real and felt community needs are not touched upon by the curriculum and that schools have no other function in the community except to hold classes reinforce the lack of perceived usefulness of the school. Moreover, there are no mechanisms by which the community can express its opinion about the school, the teachers etc., and this creates a gap between community and school.

This was clearly seen in the responses of parents and students to questions about job and educational aspirations. From these it may be inferred that for the great majority of the people the four grades of formal primary schooling are unnecessary. Rather what is needed is a type of education giving basic information and preparing students for actual or potential jobs in the surrounding community where the RSs operate.

Since there are no criteria for opening schools and little local participation in organizing and running them, it is not surprising that a large number have closed after starting up because of lack of enrollment or discontent of

the community or difficulties between teachers and the community, etc. This represents a considerable loss of invested capital for the RS organization.

It seems that the implicit criterion that has predominated in the spread of the RSs has been to prefer quantity, whether in the number of grades and school supplies or in schools and students . The RSs multiplied indiscriminately to the point of lowering their operational and administrative capacity. This has been evident in the lack of adequate attention to the schools and in the constant lowering of the quality of instruction. This later has been reflected chiefly in the following aspects:

f. Lack of proper supervision and evaluation: The RSs have sufficient staff to assure supervision of all schools and an evaluation of their operation at least once a year. There are complaints about lack of teaching materials or about radios that have broken that cannot be fixed immediately by the central headquarters. Some schools go along for a whole year or more with a broken radio and/or without enough necessary school supplies. (See Table Eleven.) The central administration, moreover, lacks a good system for feedback, for filing and making summaries of data. This shows up in the failure by RSs to have had satisfactory, periodic evaluations of their results during the 15 years of their operation.

Table 11

Complaints and Recurring Complaints of the Teachers

Problem	YEAR 1964-1965	1965-1966	1966-1967	1967-1968	1968-1969	1969-1970
(Number of schools) =	(40)	(47)	(56)	(55)	(52)	(50)
RADIO						
# complaints	26	7	16	45	98	114
Complaints by school	.65	.15	.29	.82	1.88	2.28
% recurring complaints	34.62	0.00	25.00	33.33	57.14	56.14
TEACHING MATERIALS						
# complaints	223	171	219	260	413	500
Complaints by school	5.56	3.64	3.91	4.73	7.94	10.00
% recurring complaints	30.94	33.33	35.62	47.31	46.49	56.60
FURNITURE						
# complaints	31	20	39	42	43	49
Complaints by school	.76	.43	.70	.76	.83	.98
% recurring complaints	22.58	15.00	35.90	42.83	37.40	44.90
OTHER PROBLEMS						
# complaints	61	68	80	80	96	113
Complaints by school	1.53	1.45	1.43	1.46	1.85	2.26
% recurring complaints	34.40	50.00	33.75	42.50	42.71	36.28

g. Finance Problems: The stable income of the RSs does not meet even half of the annual operating costs, without including costs of expanding or improving maintenance of the system. This has made it difficult to keep schools in steady operation or to make middle and long range plans. The expansion of the RSs has not been systematic but rather has been subject to external circumstances so that schools have been expanded only when extra money became available. Generally, they cannot count on fixed capital for extraordinary expenditures. In short, the schools have grown in such a way that they surpassed the financial capacity of the system. This means low salaries for teachers and encourages their seeking other work.

Unfortunately, the RS administration does not have an estimate of expenses. In Table Twelve there is an approximation of costs based in part on data obtained from the central administration and in part on personal estimates.

h. Personnel problems: As a consequence of overreaching the operational capacity of the system, the present personnel are not sufficient. Also, the majority of personnel who work at headquarters have a number of different jobs, sometimes having nothing to do with the RSs. This, of course, distracts attention from the schools.

Table 12

Estimated Costs of the Radio Schools During 1969-70
(in pesos)

ACCOUNTABLE COSTS	
Salaries to auxiliary teachers	$111,317.30
Salaries to central personnel	5,300.00
Maintenance of boarding schools	29,900.00
Travel and expenses	6,000.00
School material	5,756.35
Truck and plane upkeep	25,284.95
Freight charges	6,000.00
Gasoline	12,023.73
School repair	10,000.00
Summer courses	11,300.00
Miscellaneous	14,760.86
TOTAL	$237,643.19
ESTIMATED REAL COSTS	
Personnel expenses	
57 auxiliary teachers	459,648.00
radio teachers	
-regulars	24,000.00
-substitutes	12,000.00
service personnel	6,000.00
Sub-total	501,648.00
Capital expenses	
land	5,416.00
housing depreciation	98,998.00
furniture depreciation	6,248.00
transmitter depreciation	33,333.33
radio depreciation	3,180.00
truck and plane depreciation	48,571.40
Sub-total	195,746.73
Management expenses	
director's salary	60,000.00
administrator's salary	36,000.00
supervisor's salary	15,000.00
technician's salary	12,000.00
Sub-total	123,000.00
Expenses for goods and services	
light	3,600.00
truck and plan upkeep	25,284.95
building upkeep	10,000.00
interest payment	12,000.00
fuel	12,023.73
freight charges	6,000.00
Sub-total	68,908.68

(continued on next page)

Table 12
(continued)

Other expenses		
school material		5,756.85
boarding school support		29,900.00
travel		6,000.00
summer courses		11,300.00
miscellaneous		14,760.86
	Sub-total	67,717.21
	GRAND TOTAL	$957,020.62
Annual total by school		18,074.49
Monthly total by school		1,506.20
Annual total by graduate		901.15
Monthly total by graduate		75.10
Grand monthly total		$79,751.71

There is no one at headquarters or the studio who is specialized in educational radio, mass media, or rural radio. This may help explain the lack of adaptation of the curriculum to the characteristics of the medium of radio and the poor quality of the programs. The director of the project can only partially fulfill his administrative duties because he has to leave frequently in order to seek funds to cover the monthly deficit.

The auxiliary teachers, moreover, do not have sufficient training to carry on an active class or to direct group work. (See Table Thirteen.) In some cases, teachers only speak Spanish. In most cases, teachers lack sufficient motivation to give a spark to their teaching and to solve daily classroom problems.

i. <u>The problem of radio</u>: The radio in the RSs is not used to take advantage of its potential to the maximum. Moreover, the data and the observation carried out indicate that student achievement and school efficiency can only in small part be attributed to radio. The following suggest why this is so.

Only in 7 of the 24 schools that were visited was the radio even operating. There were various reasons. In some cases the set did not receive the signal because of bad weather, or only with such static that it was practically impossible to follow the classes. In the majority of cases

Table 13

Items which measure Academic and Non-academic Activity (Teachers)

	Academic Activity	No.	%	% of total
1.	Directs individual work	65	14.25	8.21
2.	Corrects individuals	54	11.84	6.82
3.	Gives instructions on procedure	42	9.21	5.30
4.	Directs group work	20	4.39	2.53
5.	Asks about procedures	19	4.17	2.40
6.	Asks for information	15	3.29	1.89
7.	Explains to the group	11	2.41	1.39
8.	Calls a student to the blackboard	8	1.75	1.01
9.	Uses the blackboard	6	1.32	.76
10.	Dictates to a student at the board	6	1.32	.76
11.	Supervises group work	4	.88	.51
12.	Asks reasoning questions	3	.66	.38
13.	Asks students to work together	2	.44	.25
14.	Asks examples from class	2	.44	.25
15.	Replies to a question with another question	2	.44	.25
16.	Rewards a good answer	1	.22	.13
17.	Encourages competitive spirit	1	.22	.13
18.	Helps a student to answer	1	.22	.13
19.	Answers his own information question	1	.22	.13
20.	Encourages student participation	1	.22	.13
21.	Asks for homework	1	.22	.13
	TOTAL	265	58.13	33.49
	Non-academic Activity			
1.	Scolds or asks for order	38	8.33	4.80
2.	Gives orders	26	5.70	3.28
3.	Leaves room	18	3.95	2.27
4.	Solves non-academic problems	16	3.51	2.02
5.	Works alone (prepares class, etc.)	12	2.63	1.53
6.	Gives permission	9	1.97	1.14
7.	Laughs at activity or error of a student	9	1.97	1.14

the radio was broken and the school was too far from a town or central headquarters to take it to be fixed. In these cases the teachers were waiting for the visit of the supervisor to send it back to headquarters. In some cases the radios were not working simply because the batteries were dead and teachers had not been given replacements. There were also teachers who could not use radio either because they had classes that spoke only Tarahumara while broadcasts were only in Spanish or because students had been absent for some time (generally for farm work) and were too far behind to follow the broadcasts. There are also areas where the radio signal simply does not reach.

One can assume that this situation is representative of what goes on during most of the year. The teachers know that they ought to use the radio and so when the official visits come from headquarters, although they may not use it at other times, they put it on for the visitor. What is more likely, the radio is broken when a visit comes. If one recalls the data in Table Eleven (complaints), one can see that the delays in fixing broken radios is a continual problem.

Auxiliary teachers and the normal school teachers who broadcast from the studio in Sisoguichi lack adequate training in the use of radio as an educational tool in the classroom. Broadcasts consist in following the class day by

day almost literally from the official textbook. Teachers who follow the radio in the classroom concentrate on directing individual work of the students. (Cf. Table Thirteen.) The majority of teachers who do not use the broadcasts base their work on the content that they have received in the summer training courses.

One may suppose that at the beginning the auxiliary teacher was really an auxiliary of the educational medium. The radio was thought of as an ideal medium to reach those places where it was more difficult for schools and teachers to be established. The reality, however, is that the teacher is the main person responsible for the class development, and the broadcasts, when they are heard, really operate as aids to the teacher. Nevertheless, the broadcasts concentrate on presenting basic concepts directly to the students and do not take advantage of the potential of radio as a real aid to present broadcast teacher. In fact, present broadcast contents are a mixture, in order of importance, of music, direct information to students, direct instructions for students and, lastly, instructions for the teachers.

One may conclude that the relative failure or success of the RSs as far as academic achievement and social efficiency are concerned can not be explained by means of the radio but rather by a combination of educational and

extracurricular factors that influence these variables among which radio plays a role of secondary importance. Still, radio in the Sierra Tarahumara has a potential not yet exploited which should be taken into account in whatever change or educational innovation is undertaken in the Sierra.*

D. Conclusions of the Study

Although this study succeeded in collecting enough information to give some answers to the questions raised by the RS administration, the general shortcomings of the system called into question the whole operation so that giving particular suggestions for improvement would not solve problems that affect the RSs, specifically, what students learn, who stays in school, and the relevance of the knowledge acquired in school. The group of general conclusions based on the data which are summarized below demand a rethinking on the part of the administration of the RSs. This should result in a clear definition of objectives, goals, policies and means, and that would give the schools a new direction and permit constant evaluation and re-evaluation. This would have to be done at the first

* A preliminary study of the potential role of radio has been recently undertaken for the RSs by the School of Communication Science of the Instituto Tecnologico de Estudios Superiores (ITESO) of Guadalajara.

stage by the missionaries themselves and be based on the objective vision of the reality of both the RSs and the Sierra Tarahumara which they serve.

The general conclusions that emerged from the study were as follows:

-- The lack of general and specific objectives of the RSs to date, have hindered the institution from knowing its successes, failures and the cost of its efforts.

-- The RSs are fulfilling satisfactorily their only explicit objective: to prepare students to want to continue their studies successfully in the regular schools. However, the cost of this result is very high. If one recalls the high rate of interyear dropouts and minimal number of graduates who continue their studies beyond fourth grade, one must conclude that the cost-benefit ratio of success in this objective is prohibitively high.

-- The very organization of the RSs, the curriculum and method of transmitting it, the objective of preparing students to start fifth grade: all of these have made the education beneficial to those who in relative terms are already in an advantaged position within the ethnic, social and economic stratification of the Sierra. Another corollary conclusion is that the same phenomenon is not providing for internal change within the communities where the RSs are found except to perhaps reinforce the unequal

ethnic and socio-economic structure of each community.

-- The curriculum content that the RSs teach and consequently the schools themselves are not adapted to the situation in which they are pperating. The socio-geographical setting of the Sierra does not provide sufficient means to assure the assimilation and recall of the knowledge learned in school. Even if one assumes that the knowledge of basic elements of reading, writing and figuring were necessary for gaining better means of defending oneself in commercial and labor transactions, there is no justification for having four years of school to get this kind of knowledge. Moreover, this lack of adaptation has promoted a gap between the school and the community.

-- The RSs have overloaded their operational, administrative and financial capacity. The consequences are a high level of mobility of teachers, lack of supervision and attention to the schools and the impossibility of middle and long range planning.

-- Radio in the RSs has not been used in a way to take advantage of its potential. In part this is due to the lack of trained personnel in all levels and the problems of supervision in the schools. Consequently, radio has only played a secondary part in student achievement and the internal and external efficiency of the schools.

These conclusions* seemed to question the very structure of the Radio Schools. For this reason, it was decided to present these data to the missionaries of the Tarahumara and elaborate more clearly defined objectives, goals, and policies. This would allow a more thoroughgoing kind of educational planning than was possible before.

The missionaries arrived at the conclusion that the RSs had to be restructured from the ground up. For this reason they agreed on the following general objective:

"The general objective of the Radio Schools of the Tarahumara is to promote a liberating, integral and community education that foments and transmits values and trains for work; all this in a spirit of dialogue."

"By 'liberating and integral education' is understood that the students be made into the subjects of their own development, promoting the struggle against oppression, both structural (socio-economic, political and cultural) and personal selfishness, in such a way that they can achieve more human conditions of life.

"By 'community education' is meant that which is not promote the spirit of individual competition, but rather the spirit of service and advancement of one's community.

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* For more details of the study, cf. Sylvia Schmelkes, "Estudio de Evaluacion Approximativa de las Escuelas Radiofonicas de Tarahumara," Revista del Centro de Estudios Educativos, II, no.2 (April 1971), pp. 11-36.

"'That foments and transmits values' means that it is the intention of this kind of education to promote values proper to the culture of the students including creative dialogue with other cultures.

"'Trains for work' means that one seeks to prepare the students to take advantage of the natural resources necessary for their human development.

"'In a spirit of dialogue' means that this kind of education seeks a mutual enrichment of the teacher and the community."*

III. Reform of the RSs Proposed by the CEE

Motivated by the objectives elaborated by the missionaries and stated above, the Centro de Estudios Educativos developed the following plan for reforming the RSs:

A. Objectives:

The general statement of objectives elaborated by the Tarahumara missionaries needs to be placed in its context for readers who may not be acquainted with current educational and social philosophy in Latin America. A major influence in many places in Latin America is the thought and practice of Paulo Freire, the Brazilian educator, whose book The Pedagogy of the Oppressed, sums up his views on man and his education/liberation. Beginning with his experiences in

* "Objectivos de las Escuelas Radiofonicas de Tarahumara," Sisoguichi (mimeo), 1971.

Northeast Brazil in the early 1960's, Freire gradually evolved both a view of education and of man, as well as a pedagogical plan of action that is critical of both the oppressive social structures in which many of the poor live and the education that contributes to the maintenance of those structures.*

It is this kind of thinking that guided the plan of reform for the RSs of the Tarahumara. On a general theoretical level, the kinds of assumptions behind the general objective stated above perhaps need to be drawn out before giving the more concrete details of the plan. Otherwise, some of the reasons for the suggestions will not be clear. The basic assumptions of Freire's educational philosophy which would also be included in the CEE plan would include the following:

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*For more information on Freire's method the reader is referred to the following:

a. Paulo Freire, La Educacion como Practica de la Libertad, Mexico: Siglo Veinteuno, 1971.

b. Paulo Freire, "Cultural Action: a Dialectic Analysis," Cuernavaca, CIDOC, Cuadernos, 1970.

c. Paulo Freire, "Cultural Action for Freedom," Harvard Educational Review, Spring, 1970.

d. A. Enriquiez, "En dialogo con una filosofia de la educacion," Mexico (mimeo), 1971.

1. The ontological vocation of man can be defined as to be more, not in an individual way but rather as joined with others.

2. Liberty is a condition of being. Consequently, man is more the more he works for his liberation; that is, the more he works to transform the oppressive situation that surrounds him.

3. Since liberation implies the transformation of concrete reality, it is necessary to objectively know the real oppressive situation and discover its causes.

4. The knowledge of the concrete situation in order to transform it implies a critical consciousness, which is an essential capacity of man; but among the oppressed of Latin America this capacity is found in a latent state. In order to develop this critical consciousness it is necessary that man understand the world not as something already completed, static, but rather as something that can be transformed by the joint action of men. It is also essential that man understand himself as incomplete, capable of transforming himself by means of the transformation of the world.

5. Since man can only liberate himself when joined with others, dialogue is an essential element in every effort at liberation.

6. Education plays an essential role in the process of the liberation of man. Education for the liberation of man is a permanent process. Moreover, it is a process that cannot be prescribed since it is the result of a reality conditioned both by history and social structure. Education is not something done <u>for</u> the student but <u>with</u> him; consequently the students are the authors of the content of their education.

7. Critical awareness (<u>concientizacion</u>) plays an essential role in the educational process. By means of this process the student is confronted with problems, he is given the clear challenge that is set out both by the world and by the perception of himself. The very action of man on the world will involve him in problems. It is the permanent process by which men critically perceive their relations with the world. The work of the educator consists of delineating for the oppressed in the spirit of dialogue his concrete existential situation as a problem that both challenges him and demands a response from him at the level of action.

In sum, one notes that Freire inists on an education that is tied to an analysis of the student's concrete situation, an education that demands an action on the part of the student to transform that reality in collaboration with others. Such an education is neither teacher-oriented nor content-oriented, nor does it fit the usual formal

school model. Its consequences are the liberation of the student from an oppressive social situation and it involves changes in the student's view of himself. Such assumptions may help to explain the concrete suggestions of the following CEE plan for the reform of the RSs.

B. Goals:

The goals proposed for the reform of the RSs can be summarized as follows:

1. The population that benefits: The problem of attending to a culturally heterogeneous population is the danger of continuing to benefit those who in one form or another already occupy a higher position in that situation. This suggests that the RSs dedicate their exclusive attention to the Tarahumara, gradually phasing out the work with other populations.

2. The kind of education: In order to avoid the danger of imposing on the population an educational content poorly adapted to the Tarahumara situation, it is proposed that the education given by the RSs be nonformal, flexible and based on the the satisfaction of the real needs of the communities.

3. The sector that benefits: Given that the desired education implies a transformation of the situation of oppression and given that those best able to take decisions in this respect are the adolescents and adults, it is

recommended that the RSs principally serve this age group and that indirectly through this means they bring about a more effective and permanent education of younger students.

4. Content of education: Education would follow three basic lines of development: fundamental education (critical awareness, literacy, arithmetic, Spanish, and methods to help satisfy the basic necessities for food, clothing, health and hygiene), education for work and in work (in accord with the natural resources and necessities of each community), and promotion of the awareness of the values of Tarahumara culture and transmission of universal values.

C. Means:

The intention is to optimize the use of the following means:

a. Radio: Since the goal is a nonformal education that adapts its activity to the necessities of each community, radio will be used as an aid to the animator of the class, especially in the area of fundamental education. Moreover, the radio will be used to train the animator outside the hours of class. There is also a possibility of utilizing the radio as an element in reflection, along with a collection of recorded audio cassettes that would circulate among the schools. One can also think about using the radio as an instrument in unifying the Tarahumara culture, using their cultural forms

and methods of communication. In this way radio could also be useful to the small family groups.*

b. Animators: Given that the kind of education to be given will be nonformal, flexible and work-oriented, and that this assumes that there will be an adaptation of the content of education in each community, the animator is the essential element in the proposed RSs. It is hoped that the animator will be a real change agent in the community where he works. For this purpose he will have to be able to communicate with the community, not only in their language but also respecting and accepting their cultural values. He will have to be able to develop work with the community and carry out both academic and non-academic activities. The animator should also be able to carry on authentic dialogue with students.

c. Schools: To fulfill the general objectives of community and work-oriented education, schools should be created that are self-sufficient and at the same time provide a favorable field for work education. This self-sufficiency will be brought about by means of small

*This presents a practical problem since the hours when the Tarahumara family is at home are early in the morning and after dark. During these hours, however, another transmitter broadcasts on the same frequency that the Radio Schools use. Nevertheless, this does not eliminate the possibility of using the commercial station for this purpose, since it can be heard throughout the state.

community businesses basically directed toward making use of the natural resources of the area.

Although it will be necessary to have a central meeting hall, the school will not be the only location where educational activity takes place. This has to permeate the whole life of the community and reach all sectors of the population.

In summary, it is hoped that by restructuring the RSs the following goals might be accomplished: to prepare the Tarahumara people for coming cultural, technological and economic changes in such a way that they are able to take advantage of these changes in the best manner possible; to help them incorporate themselves into the national development with their own identity and on an equal footing with other social groups.

The RSs would begin operating in an experimental first phase whose object would be to allow RS leaders to judge and modify the program that would be elaborated on the basis of the data from the study.

D. <u>The Present Situation</u>: <u>The Problems of Changing</u>:

While the project to restructure the RSs was in progress, the Center for Social Research and Action (CIAS) carried out a socio-economic study to discover the natural and human resources of the communites that were in the area where the RSs would be starting the first experimental stage

of the reform. CIAS also researched the forms of social organization of the Tarahumara in these locales and carried out a sociometric study to measure the degree of interaction and conflict within and between communities. These data will serve in the future to determine the kind of productive enterprise most adapted to each place: an enterprise that respects the forms of social organization of the inhabitants and takes advantage of the natural and human resources available.

The Jesuit mission also contracted an agronomist with experience in agricultural education to make a study on the possibilities of a work/study program, to determine the necessary training for animators and to make a detailed program for work/study.

A short while later the School of Communication Science of the Technological Institute of Higher Studies (ITESO), a private university in Guadalajara, became interested and carried out an exploratory study of the possibilities of radio in adult education and specifically of adults in the Sierra Tarahumara.

For several weeks in June 1972, the CEE sponsored a seminar for those who would train the future village animators. The purpose was to give them a more complete grasp of the ideas of Paulo Freire and to inform them of other similar experiences of nonformal education in Mexico,

both in urban and rural areas. It was hoped by means of the seminar to determine the possibilities of applying the Freire method and other methods of nonformal education in the Tarahumara RSs.

Given that the course for training the animators had been set for October, 1972, it was urgent to develop a way of selecting them; this would assure a solid base for the beginning of the new experiment and would, moreover, provide a knowledge of the level of learning and attitudes of these teachers. At the same time, these data were necessary to develop the training course.

On the other hand, the need was felt to have more knowledge of the specific area where the new schools were to operate. For this reason, the second objective of the seminar was to program field work that was carried out in July and August for the selection of animators, the study of the communities included within the area of interest, and the exploratory study on the possible uses of radio for the project.

However, in July the director of the RSs decided to postpone the analysis of the data in this last study, as well as the training course for animators planned for October. The reason for this was that the proposed project of the CEE would mean that the children would be neglected since the primary audience would be adolescents and adults.

The reform project as it was proposed did not interest the missionaries.

There is interest, however, to carry out a program for adult education, but the feeling of the missionaries is that the RSs ought to continue to be devoted to school children. They would like to carry out some changes that emerge from the results of the preliminary evaluation and the proposal of the agronomist for adapting more work into the formal school setting of the RSs. They also have the help of the students of the School of Communication Science of ITESO.

The project for adult education will have to be carried out as an additional project of the Tarahumara mission. However, the radio hardware, the personnel and the basic existing organization will continue to be devoted to the school children. It is clear that this decision fundamentally changes the original plan of reform proposed by the CEE.

The enthusiasm observed among the missionaries at the time of the elaboration of the objectives for restructuring the schools rapidly decreased as they felt change drawing closer. Three months before the beginning of the course for training animators, a decision was made to postpone the complete reform. The missionaries were clearly reluctant to

make such a drastic change in their work and a compromise was offered instead. What was happening was not hard to understand. It is difficult, from a human point of view, to accept the criticism that a work that had been going on for 15 years and been directed by people who had dedicated their efforts and much of their lives to it should be seen as deficient and inefficient on the basis of a series of studies by others from outside the Sierra. Such a reaction is understandable from the missionaries' point of view.

From the point of view of the evaluators, however, it seems a waste of energy to multiply educational efforts stemming from the single group of missionaries. The proposed reform rather sees an education project like the RSs as necessarily embracing the whole community. Working within the socio-economic conditions of the Sierra Tarahumara, education should act as a catalyst for development and change and to mobilize people to improve their own social, economic and fundamentally human conditions. It is a question of priorities. From the CEE study it seems clearly urgent to prepare the Tarahumara population of the Sierra for changes that are imminent. The RSs should help the Tarahumara achieve an equitable participation in the changes of the infrastructure and technology while at the same time helping them to maintain their cultural and social organization and not allowing them to be integrated into national life in a way that will

maintain their marginal position, only without the benefit of their cultural integrity.

The decision of the missionaries is a compromise: they want to continue to educate school children as well as introduce adult education. Such a decision goes against the reform proposed by the CEE which would have called for a completely new organization, different types of personnel, different financial sources for operating the schools and the creation of a new image among the people. At this point, there is a delay in making change, not a complete refusal. The missionaries find themselves divided ideologically and concerning objectives for the schools. Since the missionaries are engaged in the work of the Catholic Church, the ultimate decision for such a change rests with the bishop of the Vicar Apostolic of the Tarahumara region. This person resigned two years ago but continues on the job until a successor is named. This situation adds to the uncertainty and creates a problem in making a final decision for change.

In the short run, a meeting to think through the proposed changes with the missionaries has been planned. From such a meeting should come a decision that would hopefully mark the direction that the Radio Schools would take in the future. At this point no one can predict what that direction might be.